

Tobacco and Health in Washington State



For more information contact:

Office of Community Wellness & Prevention
Tobacco Prevention & Control Program
P.O. Box 47848
Olympia, WA 98504-7848
360-236-3671
Fax 360-236-3646

Mary Selecky
Secretary

Acknowledgements

Maxine Hates, Acting Health Officer and Assistant Secretary, Division of Community and Family Health

Lincoln Weaver, Director, Office of Community Wellness & Prevention

Mary Frost, Director, Chronic Disease Prevention & Risk Reduction

Author:

Mary LeMier, Assessment Coordinator, Office of Community Wellness & Prevention

Contributors and Consultants:

Department of Health

Eileen Silverman, Tobacco Prevention & Control Program, Office of Community Wellness & Prevention

Katrina Wynkoop Simmons, Behavioral Risk Factor Surveillance System, Center for Health Statistics

Lillian Bensley, Office of Epidemiology

Patricia Starzyk, Birth Certificate System, Center for Health Statistics

Ann Lima, Death Certificate System, Center for Health Statistics

Tom Bell, Pregnancy Risk Assessment Monitoring System, Office of Maternal and Child Health

Eric Ossiander, Office of Epidemiology

Lisa LaFond, Tobacco Prevention & Control Program, Office of Community Wellness & Prevention

Other Agencies and Organizations

Eric Einspruch, RMC Research Corporation

Philip Nickel, RMC Research Corporation

Steve Smith, Washington State Department of Revenue

Table of Contents

Preface.....	4
Background	5
Tobacco Use by Adults	9
Tobacco Use by Youth.....	16
Smoking During Pregnancy	22
Environmental Tobacco Smoke	28
Conclusions	31
References	33
Appendix A: Primary Data Sources.....	35
Appendix B: Technical Notes	39
Appendix C: Statistical Supplement	41

Preface

This report was prepared by the Department of Health's Office of Community Wellness & Prevention. This office is dedicated to reducing the burden of chronic disease and injury, and promoting the health and well-being of Washington's citizens, through programs designed to:

- Eliminate tobacco use,
- Encourage good nutrition and physical activity,
- Improve the diets of mothers, infants, and children,
- Support screening services for early detection and treatment of life-threatening conditions, and
- Promote programs for the prevention of unintentional and intentional injuries.

The Department of Health (DOH) has been collecting and assessing tobacco-related health statistics since the mid 1980s. In 1990, DOH published its first reports on tobacco and health, including recommendations for a statewide tobacco prevention and control program.^{1,2} In 1992, the state's tobacco prevention efforts were advanced in the DOH *Public Health Improvement Plan*.³, which established baseline data and year 2000 goals related to the prevalence of tobacco use for all state residents and selected target populations. Progress toward these goals was subsequently reported in the Department's 1994 report *The Health of Washington State*.⁴

During the past 5 years, tobacco has become a focal point for a variety of political and legal initiatives as well as a continuing priority for public health. The recent favorable settlement in Washington's tobacco litigation has given our state a unique opportunity to expand current tobacco prevention and control efforts.

This report is the first in a series of monographs to be produced by the Tobacco Prevention & Control Program of the Office of Community Wellness & Prevention. The data from this report will be used to identify priorities for action. Future reports will demonstrate how tobacco-related priorities are used to guide policy, and translate policy into action through the implementation of specific preventive measures.

Included in this report is the most currently available data related to the impact of tobacco on health; the populations at greatest risk for tobacco use, with a special emphasis on youth and pregnant women; and exposure to environmental tobacco smoke.

The statistics for this report were obtained from several DOH data systems as well as data produced by other state and national agencies. Primary sources of data included:

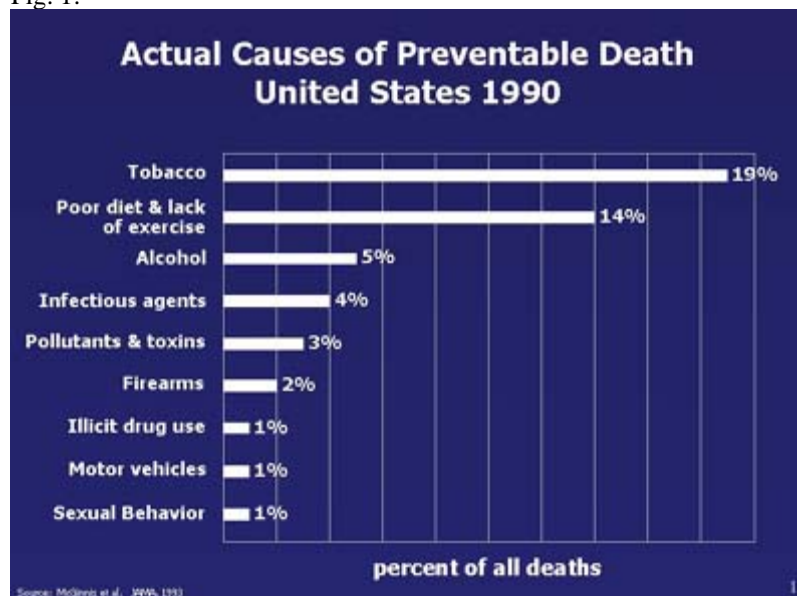
- Death Certificate System,
- Birth Certificate System,
- Behavioral Risk Factor Surveillance System (BRFSS),
- Washington State Survey of Adolescent Health Behaviors,
- Youth Tobacco Sales Compliance System,
- Cigarette sales and tax records,
- Pregnancy Risk Assessment Monitoring System (PRAMS),
- National Cancer Institute's Current Population Survey - Tobacco Use Supplement.

Background

Impact of Tobacco Use $\frac{3}{4}$ U.S. Perspective

Cigarette smoking is the leading cause of preventable death and disease in our nation.⁵ Tobacco claims more lives than drugs, alcohol, sexual behavior, firearms, and motor vehicle incidents combined.

Fig. 1:

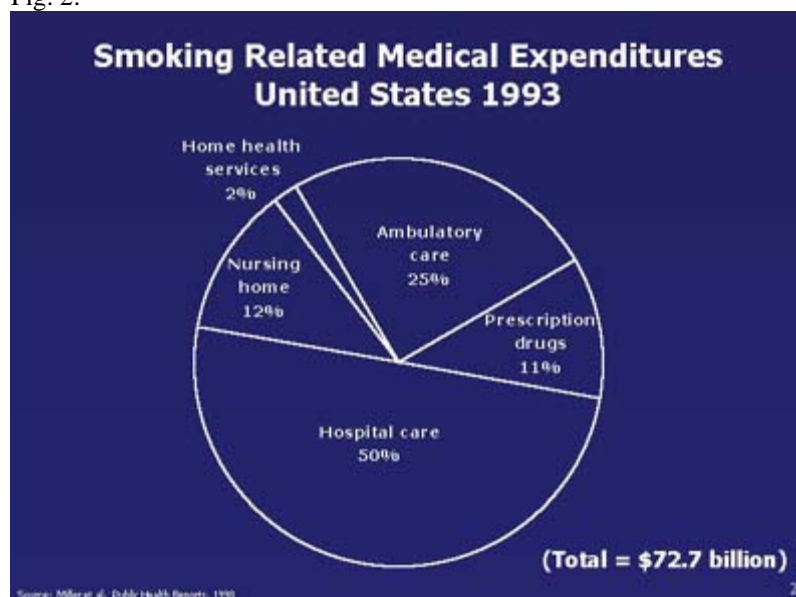


Scientific knowledge about the consequences of tobacco use has dramatically increased since the release of the first Surgeon General's Report on tobacco in 1964.⁶ It is now well documented that using tobacco products causes heart disease, cancers of the lung, larynx, esophagus, pharynx, mouth, and bladder, and chronic lung disease. Tobacco smoking also contributes to cancer of the pancreas, kidney, and cervix. Consequences of smoking during and after pregnancy include spontaneous abortions, low birthweight, and sudden infant death syndrome.⁷

Each year, more than 400,000 Americans die from tobacco-related disease.⁸ The leading causes of tobacco-attributable mortality in the U.S. are heart disease (34%), cancer of the lung, trachea, and bronchus (28%), other cancers (8%), chronic obstructive pulmonary disease (16%), and stroke (6%).

Smoking imposes a substantial economic as well as health burden. In 1993 the estimated smoking-related medical expenditures for the U.S. adult population totaled \$72.7 billion, 11.8% of the total medical expenditures.⁹ More than 43% of these costs were paid by federal and state funds.

Fig. 2:



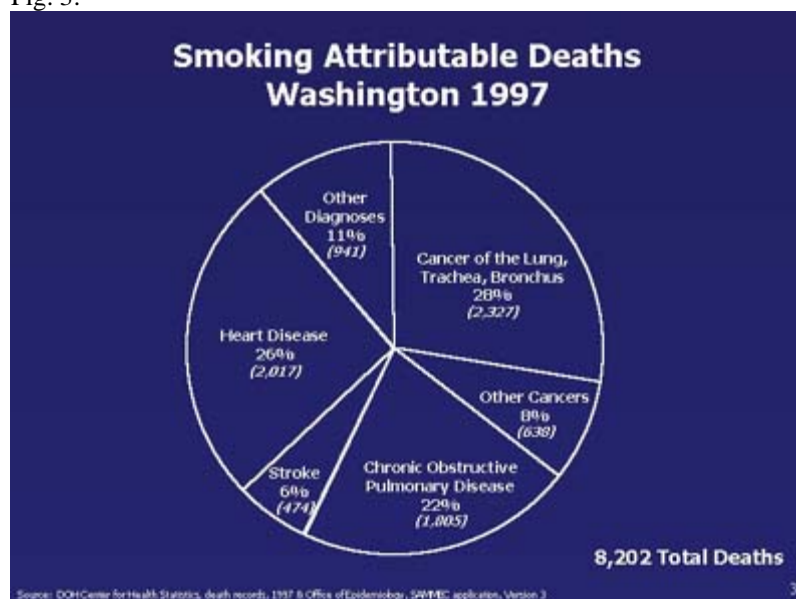
Published U.S. and state-specific estimates of cigarette smoking, smokeless tobacco use, and per capita cigarette sales indicate wide variability among states.¹⁰⁻¹³ Washington ranks average or better on many indicators of tobacco use; however, there continues to be considerable room for improvement. Washington has not yet attained the majority of its year 2000 health objectives related to tobacco.

Tobacco and Health in Washington State

Death records for 1997 identified 41,429 total deaths among Washington residents. The 10 leading causes of death were heart disease (27%), cancer (24%), stroke (8%), chronic obstructive pulmonary disease (6%), injuries (5%), influenza and pneumonia (4%), diabetes (3%), suicide (2%), Alzheimer's (1%), liver disease (1%), and all other causes (19%).

It is estimated that 8,202 (19.8%) of the deaths in 1997 were attributable to smoking. Cigarette smoking was implicated in nearly 3,000 deaths due to cancer and 2,000 deaths from heart disease.

Fig. 3:



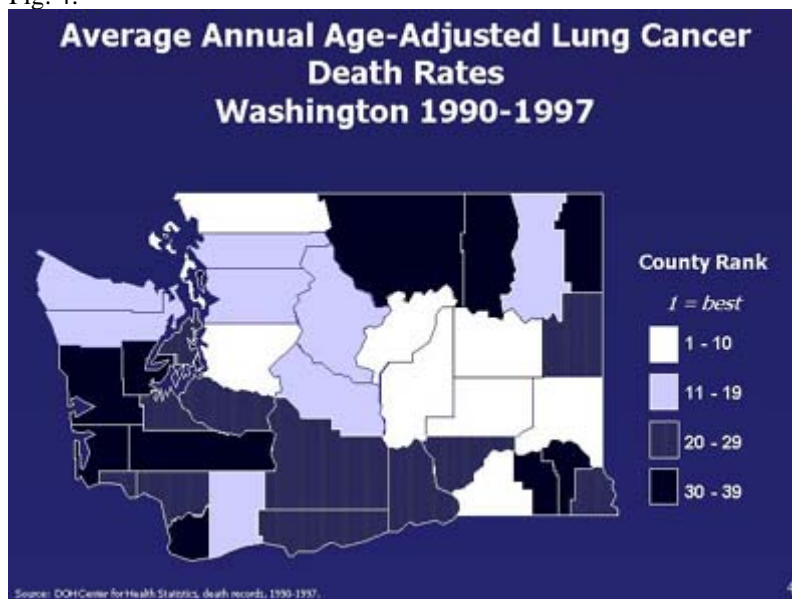
Geographic Variation in Washington

Washington data show that the impact of death and disease due to smoking is not distributed uniformly throughout our state. We see this when we examine county-level age-adjusted death rates for lung cancer, a disease highly correlated with tobacco use. (An explanation of age-adjustment is included in Appendix B).

During the period 1990-1997, age-adjusted lung cancer death rates were highest in Ferry, Garfield, Grays Harbor, Pend Oreille, Mason, Columbia, Pacific, Okanogan, Clark and Lewis Counties. Counties with the lowest age-adjusted lung cancer death rates included San Juan, Lincoln, Whitman, Douglas, Walla Walla, Adams, Whatcom, Grant, Island, and King.

Lung cancer deaths alone are an imprecise indicator of regional differences in tobacco use and its impact on health. However, when lung cancer data are combined with additional indicators such as smoking during pregnancy and smoking prevalence in the general adult population, it is evident that some areas of the state have greater need for targeted tobacco prevention and control efforts.

Fig. 4:



(County-specific age-adjusted lung cancer death rates are included in Appendix C)

Other Measures of Impact and Burden

Economic cost.

In 1993, the estimated proportion of total Washington medical expenditures attributable to smoking was 11.6%.⁹ The total dollar expenditure was \$11,522 million, which included:

- ambulatory care - \$4,324 million
- prescription drugs - \$1,333 million
- hospital care - \$4,445 million
- home health services - \$357 million
- nursing home care - \$1,063 million

Premature mortality.

In 1997, 1,858 of the deaths attributed to smoking occurred among persons under the age of 65. Ten deaths, all due to smoking-related fires and burns, occurred among persons aged 1 to 30. Among infants (under 12 months of age), there were 13 deaths attributed to exposure to secondhand smoke. The underlying causes of these deaths included premature birth, low birthweight, respiratory distress syndrome, other respiratory conditions of the newborn, and sudden infant death syndrome.

Tobacco Use by Adults

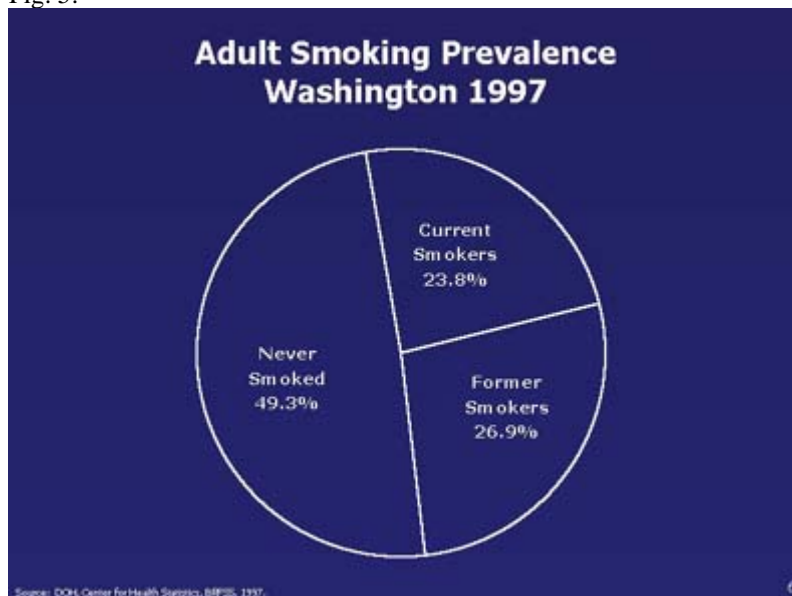
Overview

Smoking among adults has shown a pattern of decline over the past several decades. However, during each of the past two years, adult smoking prevalence in Washington increased.

In 1997, an estimated 982,708 Washington adults were smokers. Factors associated with adult smoking included a person's age, income, level of education, race and ethnicity, and geographic region of residence.

The primary source of data on adult tobacco use in Washington is the Behavioral Risk Factor Surveillance System (BRFSS). Adults include persons aged 18 or older. Smokers include persons who report they have smoked at least 100 cigarettes during their lifetime and report they current smoke every day or some days.

Fig. 5:



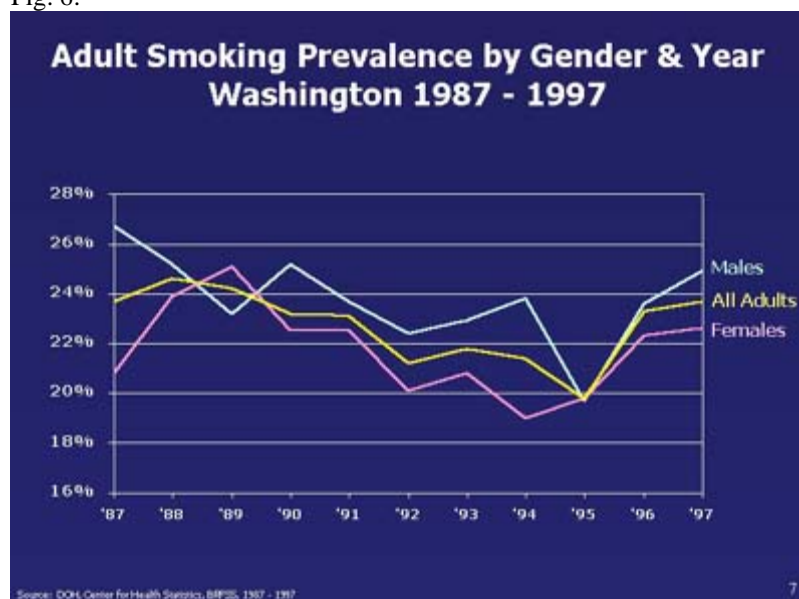
(confidence intervals for estimates shown in this chart are included in Appendix C)

Time Trends

The prevalence of smoking among U.S. adults declined steadily from the middle 1960s through the 1980s. However, smoking among adults appears to have leveled off in the 1990s. In 1997 the national prevalence of smoking among adults was 23.2%.

In Washington, the prevalence of adult smoking in 1997 was 23.8%. The lowest recorded level of smoking among Washington adults was 20.2% in 1995. Smoking prevalence estimates have increased during each of the past two years. These increases are at odds with smoking prevention and control efforts and should be closely monitored.

Fig. 6:



(confidence intervals for estimates shown in this chart are included in Appendix C)

Year 2000 Goals

Washington's goal for the year 2000 is a smoking prevalence in adults not to exceed 15% (1992 baseline: 21.4%)⁴ If current trends continue, Washington is not likely to meet this goal.

Geographic Variation

The BRFSS is used to provide statewide estimates of adult smoking prevalence. Although the number of survey respondents is too small to permit county estimates, by combining counties and several years of data, it is possible to generate regional estimates for comparison.

During the 5-year period 1993-1997, the region with highest prevalence of smoking among adults was Region 10, including Grays Harbor, Lewis, and Pacific Counties. The estimated smoking prevalence for residents of this region (29.2%) was significantly high ($p = .008$) compared to other regions of the state. Two regions, Region 7 (King County) and Region 17 (Asotin, Columbia, Garfield, Walla Walla, and Whitman Counties) reported adult smoking levels significantly below other regions of the state ($p < .001$). The smoking prevalence estimates for Regions 7 and 17 were 18.8% and 13.8%, respectively.

Fig. 7:

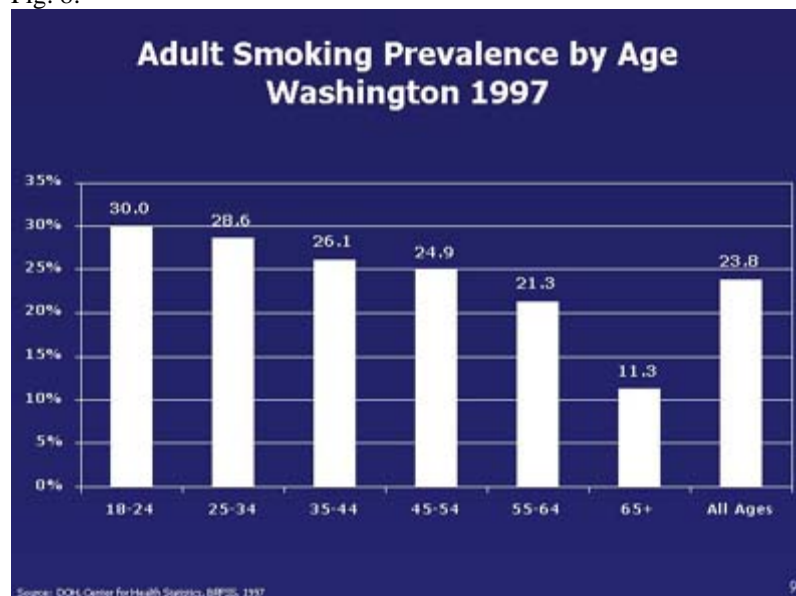


Age and Gender

In the adult population, smoking tends to be more common among males than females. In 1997, the prevalence of smoking was 25.0% for males compared to 22.6% for females.

Smoking tends to be most common among young adults. In 1997, the prevalence of smoking was highest for adults aged 18-24 years (30.0%) and lowest for persons aged 65 or older (11.3%).

Fig. 8:



(confidence intervals for estimates shown in this chart are included in Appendix C)

Race and Ethnicity

During the period 1993-1997, American Indian/Alaska Native adults reported the highest prevalence of smoking (36.7%). This finding is consistent with national data, which further show considerable variations in tobacco use prevalence by tribe.¹⁴ Asian/Pacific Islanders had the lowest prevalence of smoking (16.0%), which is also consistent with national data.

Fig. 9:



(confidence intervals for estimates shown in this chart are included in Appendix C)

We further examined the race and ethnicity of smokers by gender and found that for both men and women, smoking prevalence was highest among American Indians/Alaska Natives and lowest among Asian/Pacific Islanders.

When assessing the prevalence of smoking for various race/ethnic groups it is important to remember that 90.7% of smokers and 88.5% of the total state population are white. The second largest race group in Washington is Asian/Pacific Islander (6.9%), followed by African American (3.5%) and American Indian/Alaska Native (1.9%). Persons of Hispanic descent may be of any race. Hispanics comprise 6.2% of the state's population.

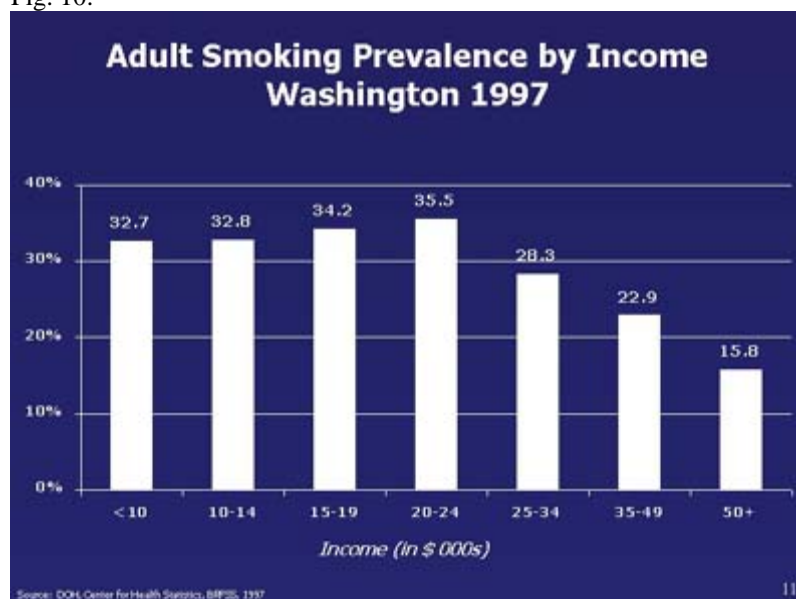
Barriers and Motivators

Identifying unique characteristics of smokers compared to nonsmokers can be helpful in targeting smoking prevention and cessation efforts. Important predictors of smoking status include a person's age, income, and education level. Among current smokers, important indicators of ability or desire to quit smoking include level of nicotine addiction, previous efforts to quit, and the price of cigarettes.

Low Income

In 1997, as in previous years, persons with an annual income under \$25,000 were much more likely to smoke than persons in higher income brackets. The smoking prevalence exceeded 30% for all income categories under \$25,000 per year. The lowest smoking prevalence was among adults who earned \$50,000 per year or more.

Fig. 10:

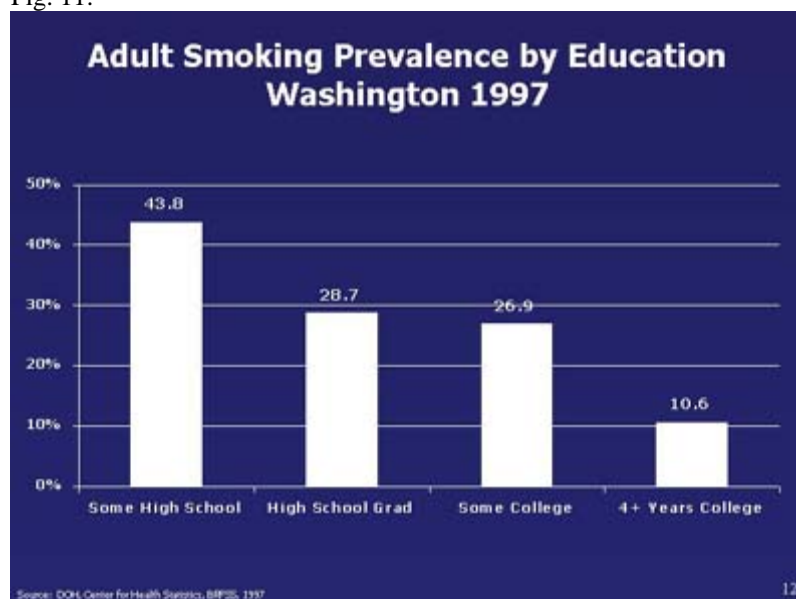


(confidence intervals for estimates shown in this chart are included in Appendix C)

Level of Education

The 1997 data showed that smoking prevalence was highest (43.8%) among persons who did not finish high school. College graduates had the lowest smoking prevalence (10.6%). This finding for Washington is also consistent with national data.

Fig. 11:



(confidence intervals for estimates shown in this chart are included in Appendix C)

Level of Nicotine Addiction

The available data indicate the majority of adult smokers in Washington are habituated to nicotine. Among smokers in 1997, 78% reported they smoked every day while 22% reported they smoked some days. Daily smokers consumed nearly one pack of cigarettes per day (mean = 18.8, range 2 to 70). Occasional smokers, while consuming less overall, still averaged about 5 cigarettes per day (range 1-30).

Among regular smokers, tests for trends covering the period 1987-97 revealed no significant change in the number of cigarettes smoked per day ($p = .276$). Trends in cigarette consumption among occasional smokers could not be assessed due to changes in the BRFSS definition of occasional smokers and the method for collecting the number of cigarettes smoked per day in this population.

Efforts to Quit

There is evidence that the majority of current smokers would like to quit. In 1997, 51.1% of daily smokers indicated they had quit smoking for 1 or more days during the preceding year.

Cigarette Prices

As with most consumer products, the demand for cigarettes is expected to decrease when price is increased. Economists have predicted a 10% increase in the price of cigarettes will reduce overall smoking among adults by approximately 4%.¹⁵

In Washington, cigarette prices have steadily increased during the past decade while per capita taxable sales of cigarettes have declined. If taxed cigarette sales are used as a surrogate for cigarette consumption, it appears that increases in price are having the desired deterrent effect. Unfortunately, when we make further comparisons with BRFSS data on adult smoking, a less encouraging picture emerges.

Fig. 12:



The trend in the prevalence of smoking among adults is flat compared to the decline in per capita cigarette sales. This inconsistency in the data cannot be attributed to a reduction in the number of cigarettes smoked per day by smokers. A likely explanation is that cigarette price increases are encouraging smokers to acquire cigarettes in border states with lower taxes, or through non-taxed sources such as military bases and Indian reservations.¹⁶

Use of Smokeless Tobacco

Smokeless tobacco includes products such as chewing tobacco and snuff. In Washington, the use of smokeless tobacco is fairly uncommon; therefore several years of data must be combined to develop

reliable prevalence estimates. For the period 1993-1997, 2.9% of Washington adults reported themselves as smokeless tobacco users.

As with cigarette smokers, adult smokeless tobacco users tend to be young and male. During 1993-1997, 6.1% of adults aged 18-24 used smokeless tobacco. The use of smokeless tobacco declined to 1.5% for persons in the 35 or older age category. The use of smokeless tobacco among males was 5.7% compared to 0.1% for females.

Tobacco Use by Youth

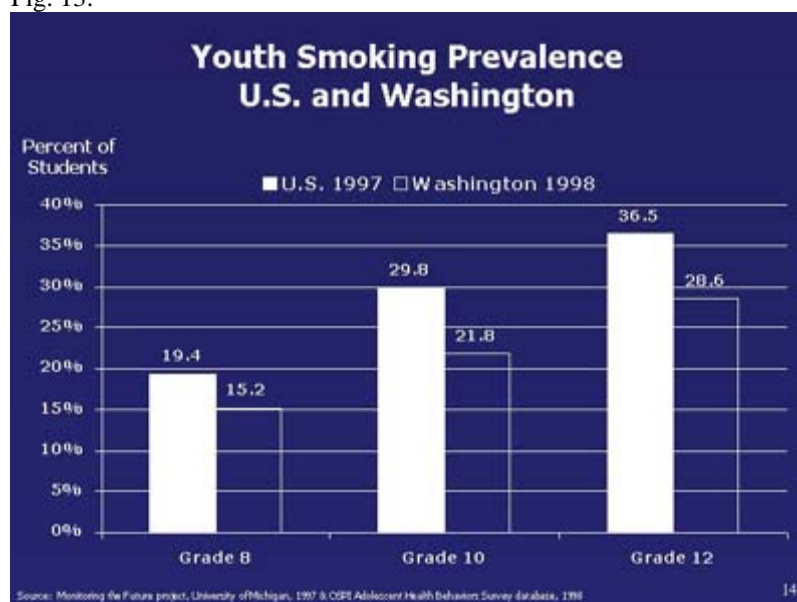
Overview

Preventing tobacco use among youth has emerged as a major focus of tobacco control efforts. A major reason is that tobacco use and addiction take root in adolescence. Among adults in the United States who have ever smoked daily, 82% tried their first cigarette before age 18, and 53% became daily smokers before age 18.¹⁷

In 1998, 4.7% of Washington's 6th grade students reporting smoking during the past 30 days. This percentage increased to 21.8% for 10th graders and 28.6% for high school seniors. Factors associated with youth smoking included poor school performance, low commitment to school, poor social skills, friends who used tobacco, and personal use of other drugs.

The primary source of data on tobacco use by youth is the Washington State Survey of Adolescent Health Behaviors (WSSAHB), which includes Washington's enrolled public school population in grades 6, 8, 10, and 12. Unless otherwise indicated, smokers include youth who reported smoking any cigarettes during the past 30 days.

Fig. 13:



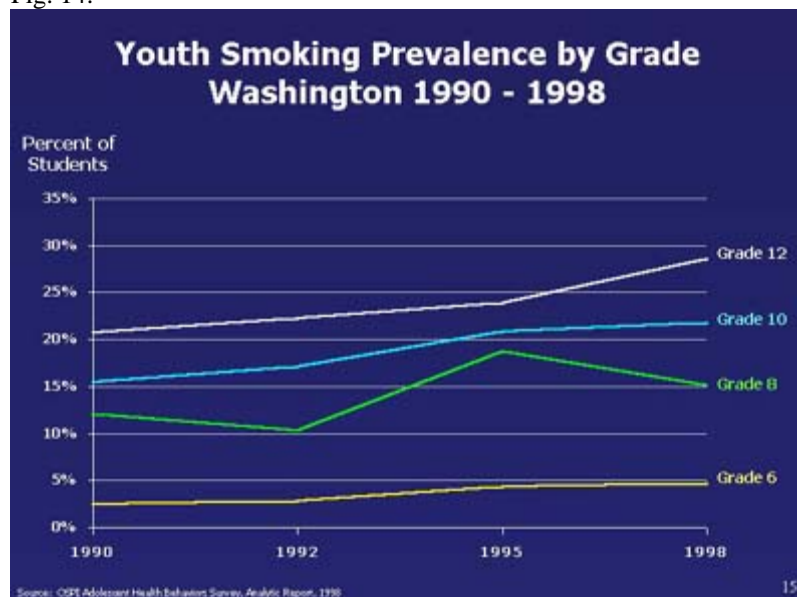
(confidence intervals for estimates shown in this chart are included in Appendix C)

Time Trends

Nationally, tobacco use among adolescents increased in the 1990s after experiencing decreases in the 1970s and 1980s. National data from the 1997 Monitoring the Future study indicated that past-month smoking among 8th, 10th, and 12th graders was 19.4%, 29.8%, and 36.5%, respectively.¹² These rates represent increases of 20% to 40% since 1991.

In Washington, the percentage of youth who smoke is lower than national figures. However, similar to the national experience, there appears to be an upward trend in youth smoking. Data from the WSSAHB for the years 1990 to 1998 show that the prevalence of smoking increased for 6th graders (from 2.4% to 4.7%), 10th graders (from 15.5% to 21.8%), and high school seniors (from 20.7% to 28.6%). There was no discernible trend in smoking among 8th graders. Additional years of data are needed to precisely depict smoking patterns and trends for specific age groups.

Fig. 14:



Year 2000 Goals

Washington's goal for the year 2000 is to reduce the prevalence of smoking among 12th graders to 10% (1992 baseline: 22.3%)⁴ If current trends continue, Washington is not likely to meet this goal.

Regional Variation

The design of the WSSAHB allows for analysis of youth smoking patterns at the statewide level and for the following four regions:

- Puget Sound (King and Pierce Counties),
- Northwest (Whatcom, San Juan, Skagit, Island, and Snohomish Counties),
- Southwest (Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Kitsap, Klickitat, Lewis, Mason, Pacific Skamania, Thurston, and Wahkiakum Counties), and
- Eastern (Adams, Asotin, Benton, Chelan, Columbia, Douglas, Ferry, Franklin, Garfield, Grant, Kittitas, Lincoln, Okanogan, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman, and Yakima Counties).

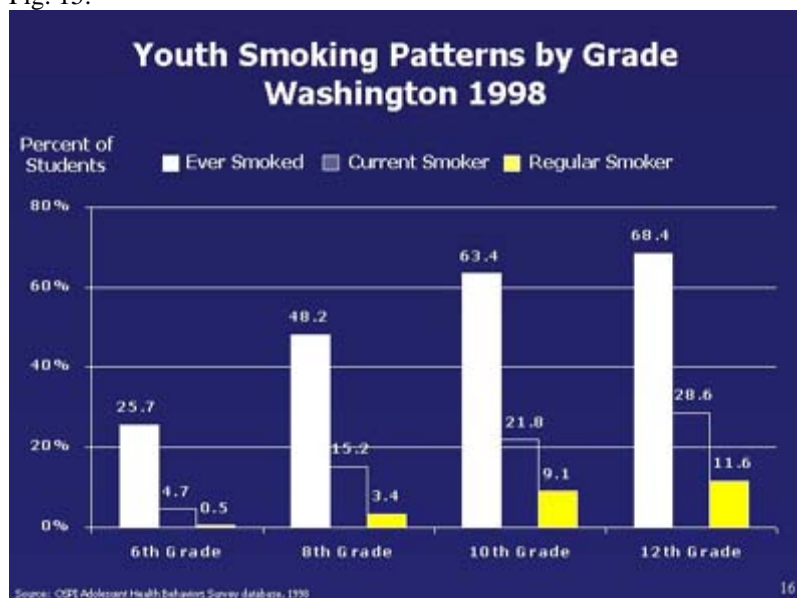
In 1998, there were no statistically significant differences in the regional smoking prevalence estimates for middle school age youth (6th and 8th graders) or high school students (10th and 12th graders). It should be noted that smoking levels may indeed vary by county or city; however, the adolescent health behavior survey was not designed for small area analysis and could not be used for this purpose.

Age and Gender

As youth become older they are more likely to experiment with cigarettes or become smokers. In 1998, 25.7% of sixth graders reported they had experimented with tobacco, this percentage increased to 48.2% by 8th grade, and 68.4% by 12th grade. A similar age-related pattern was evident for youth who smoked any cigarettes during the past 30 days, and regular smokers (youth who smoked more than 5 cigarettes per day).

Among students who indicated they had experimented with cigarette smoking, the average age of first tobacco use was 12.0 years.

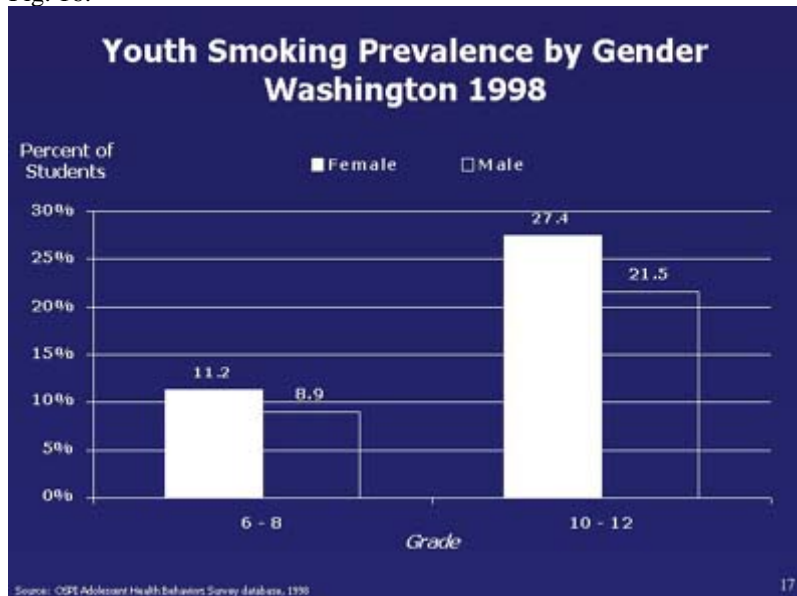
Fig. 15:



(confidence intervals for estimates shown in this chart are included in Appendix C)

Females are more likely to smoke than males in middle school and high school. Among adults, however, smoking is more prevalent among men. The differences in male versus female smoking patterns are significant and warrant further investigation.

Fig. 16:



(confidence intervals for estimates shown in this chart are included in Appendix C)

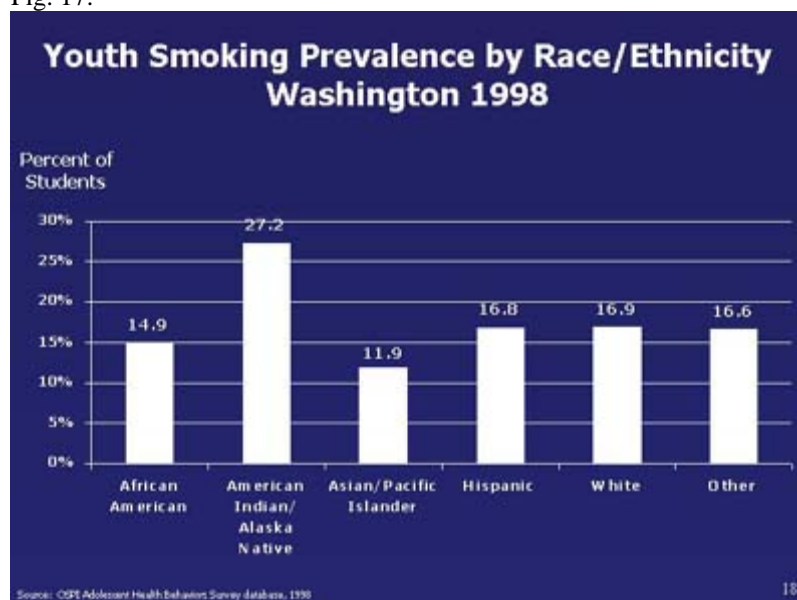
Race and Ethnicity

Data from the 1998 WSSAHB indicated that the prevalence of smoking was highest among American Indian/Alaska Native youth (27.2%), followed by white youth (16.9%). Asian/Pacific Islanders had the lowest reported smoking prevalence (11.9%). The findings did not vary when race/ethnicity was

analyzed in conjunction with gender. These findings are similar to those obtained from surveys of the adult population in Washington.

It should be noted that the method for collecting race/ethnicity information on the student survey differs from the method used for the BRFSS and birth certificates. Whereas the BRFSS and birth certificates ask race and Hispanic ethnicity as two separate questions, the student survey has one race question and Hispanic is considered a category of race.

Fig. 17:



(confidence intervals for estimates shown in this chart are included in Appendix C)

Barriers and Motivators

Psychosocial Factors

Published studies have shown that youth who smoke are likely to have low self-esteem, perceive that tobacco use is normal, have peers and siblings that use and approve of tobacco use, and lack self-efficacy in the ability to refuse offers to use tobacco.¹⁷ Data from the 1998 WSSAHB showed similar findings: Comparing smokers and nonsmokers, youth who smoked were more likely to use other drugs such as alcohol, have friends who smoked, have low performance and commitment to school, and poor interpersonal/ social skills.

Fig. 18:

Behavioral Risk Factors Associated with Youth Smoking Washington 1998				
<i>Risk Factors:</i>	<i>Smokers</i>		<i>Non-smokers</i>	
	%	95% CI	%	95% CI
Personal alcohol use	83.0	(81.0,84.9)	24.3	(21.9,26.8)
Poor school performance	40.4	(37.0,43.8)	15.6	(14.4,16.9)
Low commitment to school	61.1	(58.4,63.9)	26.5	(24.5,28.6)
Poor social skills	69.3	(65.9,72.5)	24.2	(22.3,26.1)
Best friends smoke	96.8	(95.7,97.6)	50.0	(47.0,52.9)

Source: OPH Adolescent Health Behavior Survey database, 1998

Level of Nicotine Addiction

A principal determinant for continued tobacco use is the addictive nature of tobacco. There is overwhelming evidence that tobacco is addictive and that addiction occurs in most smokers during adolescence. The 1998 WSSAHB provided evidence that youth are becoming habituated to nicotine as early as 8th grade. Among 8th grade students, 3.4% reported they were daily smokers, consuming a minimum of 5 cigarettes a day. Among 10th and 12th graders, the proportion of students who were daily smokers was 9.1% and 11.6%, respectively.

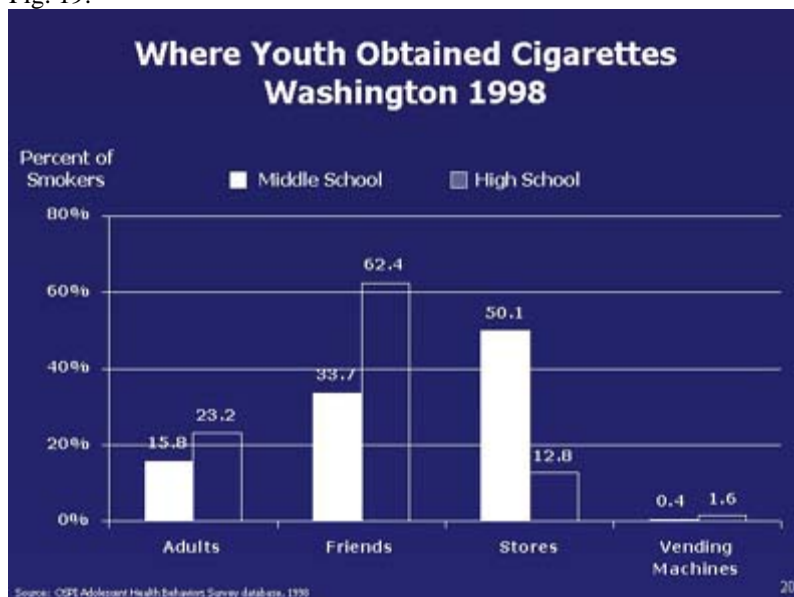
There is compelling evidence that young people today are aware of the health risks associated with tobacco; however, they may not fully comprehend or accept the addiction potential and its effect on their future. For example, among students who were high school seniors during 1976 to 1986, a total of 44% of daily smokers believed that in 5 years they would not be smoking; however, follow-up studies have indicated that 5 to 6 years later, 74% of these persons remained daily smokers.¹⁷

Access to Tobacco

In the 1998 WSSAHB, students were asked about the availability of cigarettes and how they usually obtained them. Smokers and nonsmokers differed significantly ($p < .001$) in their perception of the availability of cigarettes in their communities; 84.1% of smokers and 38.0% of nonsmokers reported that cigarettes could be easily obtained in their community.

Among smokers, access to and methods for obtaining cigarettes differed by age. Eighty percent of smokers in middle school, and 95.6% of smokers at the high school level, reported they had easy access to cigarettes. The majority (62.4%) of middle school students obtained their cigarettes from friends. In contrast, among high school students, 50.1% obtained their cigarettes from stores. Adults were a second important source of cigarettes for both middle school and high school students.

Fig. 19:

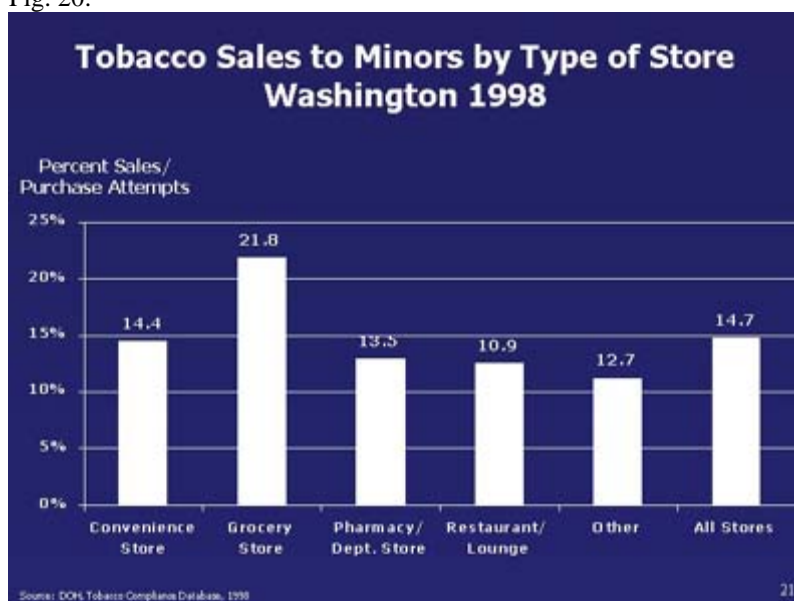


(confidence intervals for estimates shown in this chart are included in Appendix C)

The Department of Health's 1998 data on tobacco sales to minors showed that 14.7% of underage youth who attempted to buy cigarettes were able to do so. Although this rate is substantially better than the national average (Washington is one of only four states whose rate of tobacco sales to minors is under 20%), it is far from compliant with state laws regarding tobacco sales to minors.

The 1998 compliance check data showed that grocery stores were more likely to sell cigarettes to minors compared to other types of stores; 21.8% of purchase attempts at grocery stores were successful. Further, female clerks were more likely to sell to minors compared to their male counterparts.

Fig. 20:



(confidence intervals for estimates shown in this chart are included in Appendix C)

Regional comparisons based on compliance check data for the two-year period 1997 and 1998 showed that the highest rates of tobacco sales to minors occurred in:

- Region 16 (Yakima County) 30% sales rate;
- Region 2 (Island, San Juan, and Skagit Counties) 27% sales rate; and
- Region 10 (Grays Harbor, Lewis, and Pacific Counties) 23% sales rate.

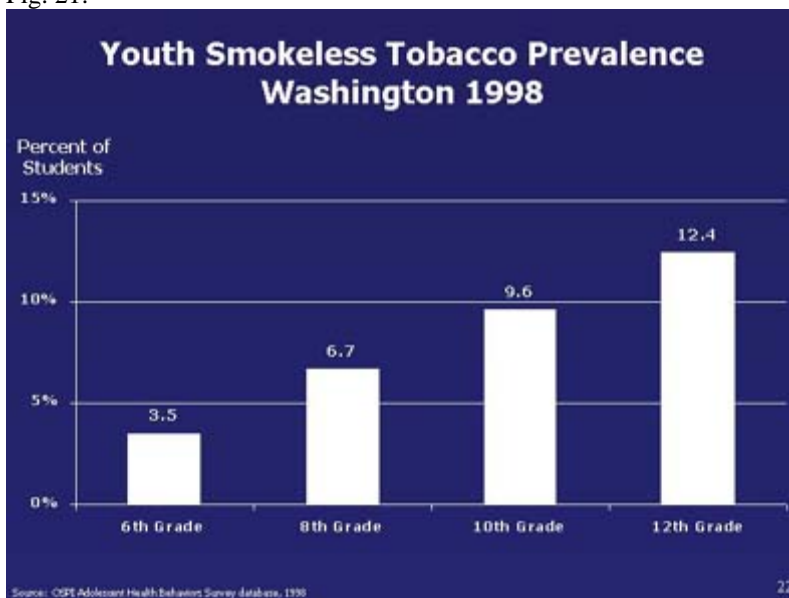
Price of Cigarettes

The U.S. General Accounting Office has estimated that smoking rates among youth will decline by 7-12% for every 10% increase in the price of cigarettes.¹⁸ In Washington, however, youth smoking rates continue to climb despite cigarette price increases. The reasons for this are unknown and warrant additional investigation.

Use of Smokeless Tobacco

In the 1998 WSSAHB, 7.7% of youth in grades 6 through 12 reported using smokeless tobacco at least once during the past 30 days. As with cigarette smoking, the use of smokeless tobacco was most common among older students. In 1998, 3.5% of 6th graders reported they had used smokeless tobacco during the past 30 days. The percentage increased to a high of 12.4% for high school seniors.

Fig. 21:



(confidence intervals for estimates shown in this chart are included in Appendix C)

Smokeless tobacco use is far more characteristic of males than females. In 1998, the prevalence of smokeless tobacco use for males in grades 6 through 12 was 10.8%. In contrast, smokeless tobacco use among females in these same grades was 4.5%. Gender-related differences were most evident among older students. For example, among high school seniors, 19% of males reported using smokeless tobacco in the past 30 days compared to 6% of females.

Smoking During Pregnancy

Overview

Smoking during pregnancy can lead to intrauterine growth retardation and low birthweight, leading causes of infant mortality. It is also a significant risk factor for spontaneous abortion and stillbirths.

Further, parental smoking has been associated with long-term effects on a child's growth, intelligence, and behavior.

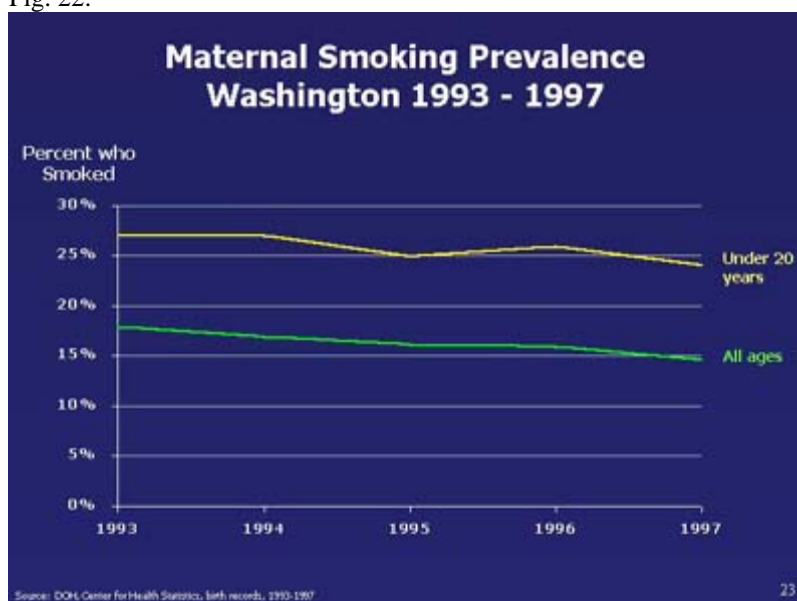
In 1997, nearly 11,000 Washington babies were born to mothers who smoked during pregnancy. Factors associated with maternal smoking were similar to those reported for the general adult population, with income and education among the strongest predictors of smoking status.

The primary sources of data on smoking during pregnancy are birth certificates and the Pregnancy Risk Assessment Monitoring System (PRAMS).

Time Trends

The percentage of women who reported smoking during pregnancy declined steadily from 17.9% in 1993 to 14.6% in 1997. Among young women under age 20, who tend to be at higher risk for adverse pregnancy outcomes and have higher rates of maternal smoking, the percentage of reported smokers dropped from 27.2% to 24.1%.

Fig. 22:



While these data are encouraging, it is important to remember that they are based on information supplied by mothers for birth certificates. As the public becomes more aware that smoking during pregnancy is harmful to the fetus, a woman who smoked during pregnancy may become less willing to report this fact.

Year 2000 Goals

Washington's year 2000 goals related to maternal smoking include a goal for pregnant women of all ages, and a goal for pregnant women under the age of 20. For women of all ages, the goal is 10% (1992 baseline: 19.9%). For women under the age of 20, the goal is 15% (1992 baseline: 30.4%).⁴ If current trends continue, Washington will move toward but not meet these year 2000 goals.

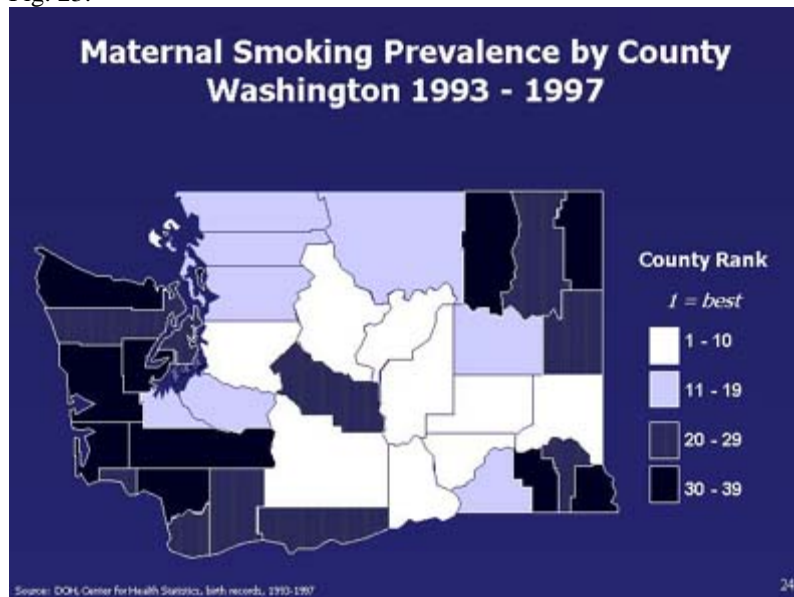
Geographic Variation

Based on birth certificate data for the period 1993 through 1997, counties with the highest levels of maternal smoking included Columbia, Pend Oreille, Grays Harbor, Clallam, Cowlitz, Ferry, Pacific,

Mason, Asotin, and Lewis. The counties with the lowest levels of maternal smoking included Adams, Chelan, Franklin, Whitman, Douglas, King, San Juan, Yakima, Grant, and Benton.

Maternal smoking is an imprecise indicator of regional differences in tobacco use and its impact on health. However, when these data are combined with additional indicators, it appears that some areas of the state have greater need for targeted tobacco prevention and control efforts. For example, three of the ten counties that rank highest in maternal smoking (Lewis, Grays Harbor, and Pacific Counties) are also among the leading counties for lung cancer deaths, adult smoking prevalence, and tobacco sales to minors.

Fig. 23:

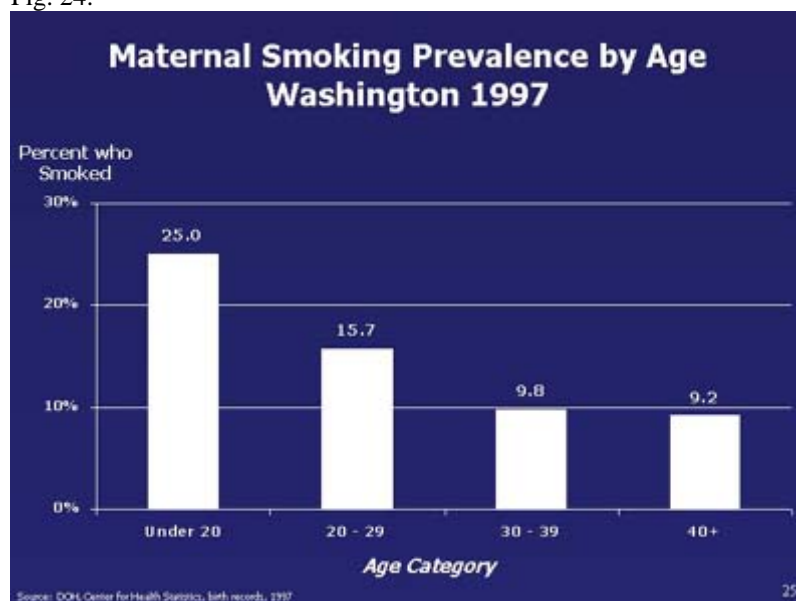


(see Appendix C for county-specific percentages)

Age

In 1997 there were 10,890 births to women who smoked during pregnancy. Smoking was most common among young mothers. In 1997, maternal smoking was reported in 25% of births to women under age 20. Smoking decreased with mother's age to a low of 9% for births to women aged 40 or older.

Fig. 24:

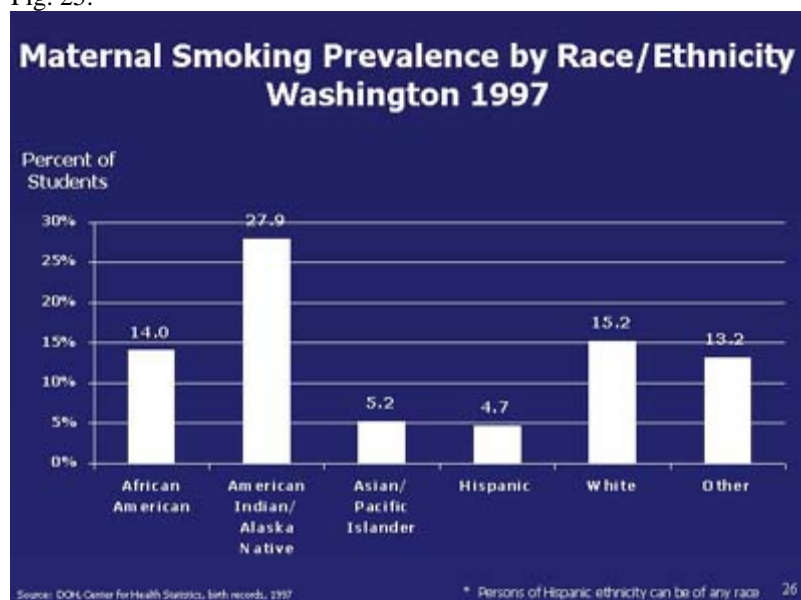


Race and Ethnicity

In 1997, white births accounted for 80% of all births in the state, and 88% of births to mothers who smoked. Accordingly, the average statewide prevalence of smoking during pregnancy (14.6%) largely reflects the prevalence among white women (15.2%).

Although the largest numbers of pregnant women who smoke are white, American Indian/Alaska Native women have by far the highest smoking prevalence. In 1997, 27.9% of American Indian/Alaska Native women smoked during pregnancy. Groups with the lowest prevalence of maternal smoking were Hispanics (4.7%) and Asian/ Pacific Islanders (5.2%).

Fig. 25:



Motivators and Barriers

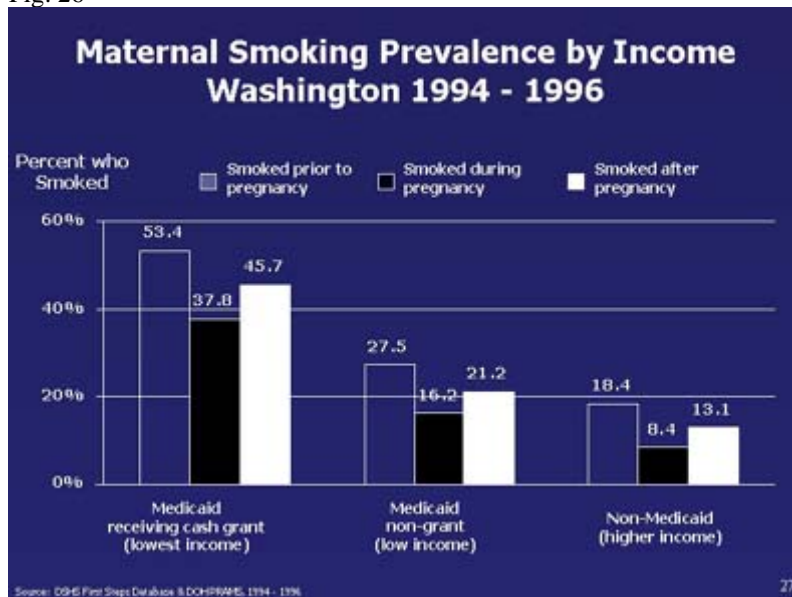
The risk factors for smoking during pregnancy are similar to those reported for the general adult population, with income and education among the strongest predictors of smoking status. One of the

strongest motivators for getting women to quit smoking during pregnancy is a woman's concern for the health of her child.

Low Income

The relationship between smoking, pregnancy, and poverty is very strong. Based on 1994-1996 PRAMS data, it is evident that the lowest income women (i.e., women on Medicaid who receive cash grants) are most likely to smoke prior, during and after pregnancy, compared to women in other income brackets.

Fig. 26

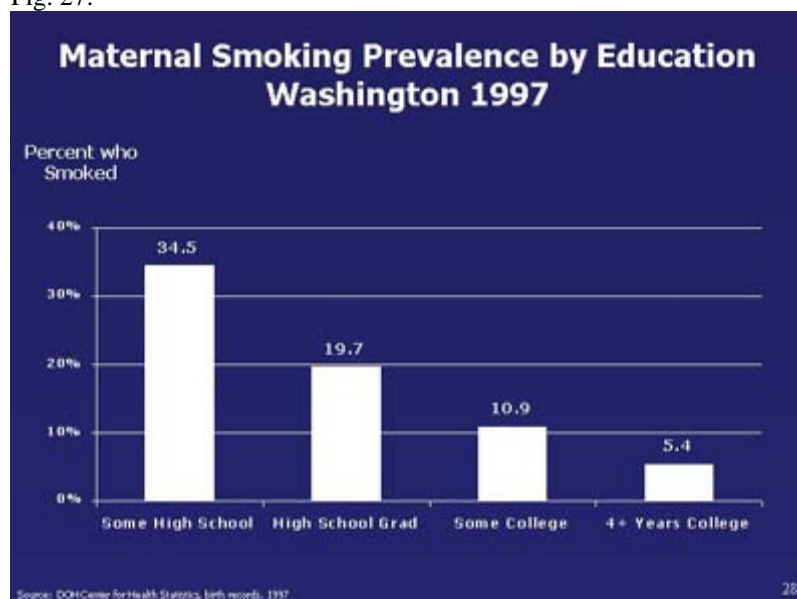


(confidence intervals for estimates shown in this chart are included in Appendix C)

Less Education

The available data strongly suggest that staying in school is a protective factor against smoking. Among pregnant women, those with the lowest level of education tend to have the highest prevalence of smoking. In 1997, 34.5% of pregnant women who had not finished high school were smokers, compared to a prevalence of 19.7% for high school graduates, 10.9% for women with 1 to 3 years of college, and 5.4% for women with 4 or more years of college.

Fig. 27:



Concern for the Child

Pregnancy can provide a window of opportunity for smoking cessation interventions. A woman's concern for her unborn child can be a powerful catalyst to stop smoking and change other unhealthy behaviors. The 1994-1996 PRAMS data showed that 42.7% of women who smoked prior to becoming pregnant quit during pregnancy. Among the heaviest smokers, women in the lowest income group, smoking prevalence during pregnancy declined 29.2%.

Unfortunately, the PRAMS data also showed that the effect of pregnancy on smoking is short-term. A postpartum measure of smoking status, collected 2-6 months after delivery, showed that smoking levels increased after pregnancy. Post-pregnancy smoking levels were not as high as the pre-pregnancy levels; however, this may simply reflect the short period for follow-up rather than a true change in smoking status.

Level of Nicotine Addiction

Women who smoke during pregnancy tend to be regular, daily smokers. In 1997, the average cigarette consumption among pregnant women was half a pack (10.1 cigarettes) per day.

Environmental Tobacco Smoke

Overview

Washington State does not have data systems to monitor residents' exposure to environmental tobacco smoke (ETS). The magnitude of this problem and its effect on the health of Washington citizens are currently assessed with survey data collected by the U.S. Census Bureau, national estimates, and findings from published research. These sources substantiate two important facts about ETS: (1) it has serious health consequences and (2) it is common.

Health Consequences

Researchers have identified more than 4,000 chemical compounds in tobacco smoke; of these, at least 43 cause cancer in humans and animals.¹⁹ Each year, because of exposure to ETS, an estimated 3,000 nonsmoking Americans die of lung cancer, and 150,000 to 300,000 children suffer from lower respiratory tract infections.¹⁹ Studies have also found that secondhand smoke exposure causes heart disease among adults.^{20,21}

Magnitude of Exposure

Data reported from a nationally representative sample of the U.S. population aged 4 and older indicated that among non-tobacco users, 87.9% had detectable levels of serum cotinine, a biological marker for exposure to ETS.²² Of note, only 37% of adult nonsmokers were sufficiently aware of their exposure to report having been exposed. Both home and workplace environments were found to significantly contribute to widespread ETS exposure.

Data from a 1996 study indicated that 21.9% of U.S. children and adolescents under age 18 (approximately 15 million children and adolescents) were exposed to secondhand smoke in their homes.²³

Year 2000 Goals

Washington's year 2000 goals related to ETS are to:

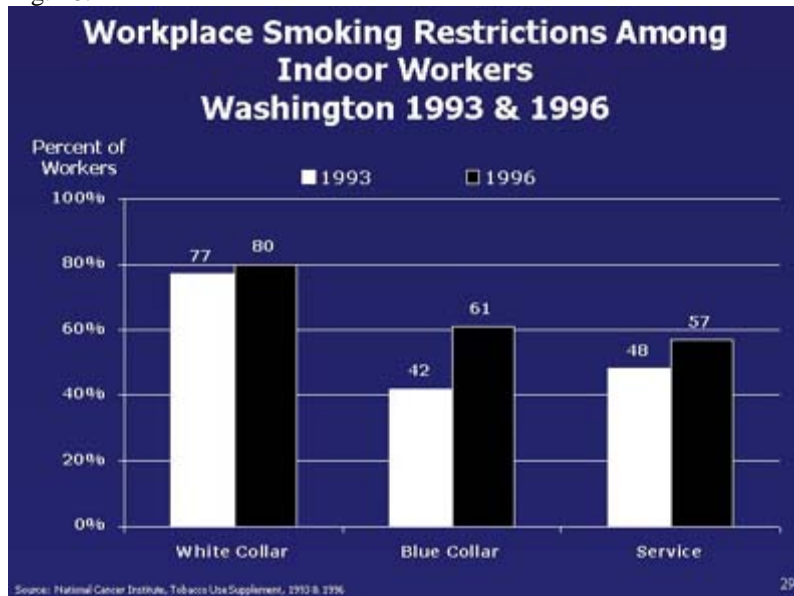
1. Enact a comprehensive clean indoor air law that prohibits smoking or limits it to separately ventilated areas;
2. Establish tobacco-free environments in all elementary, middle, and secondary schools; and
3. Increase to 75% the proportion of work sites with a formal smoking policy that prohibits or severely restricts smoking in the workplace.¹⁴

Washington partly met the first goal in 1985 by establishing the Clean Indoor Air Act. This law (RCW 70.16) protects people from indoor tobacco smoke while conducting personal or public business. The law states that "no person may smoke in a public place except in designated smoking areas." Signs must be clearly posted at all entrances to designated smoking areas. The law falls short of the year 2000 goal by failing to require that that smoking sections be in separately ventilated areas and by exempting restaurants, bars, taverns, bowling alleys and bingo parlors.

The second goal of establishing tobacco-free schools has been met. State law (RCW 28A.210.310) requires that all public and alternative schools maintain tobacco free campuses. Enforcement of this law, especially in areas immediately surrounding school grounds, remains a challenge.

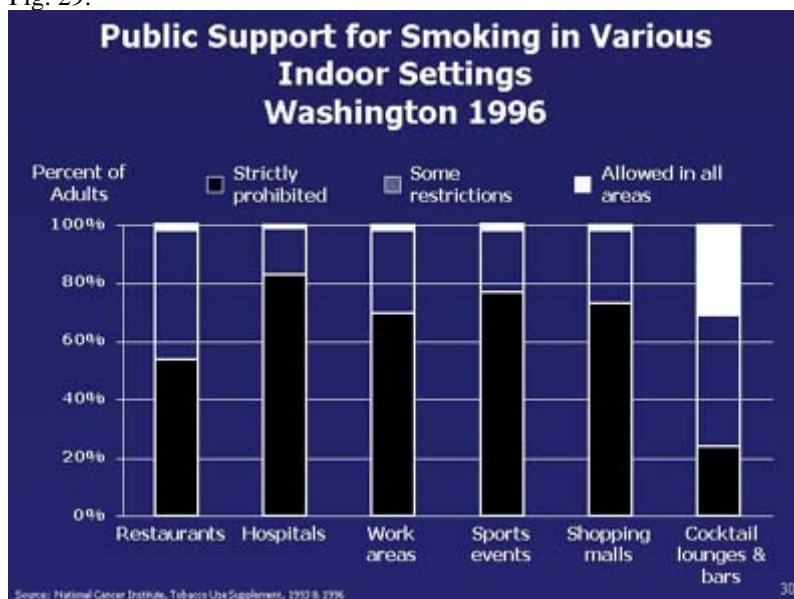
The third goal of reducing smoke exposure at work has been realized in some but not all occupational settings. In 1996, 79.9% of indoor white collar workers reported that their workplace was smoke-free, compared to 60.7% of indoor blue collar workers, and 56.7% of indoor service workers. The following comparison of workplace smoking restrictions for 1993 and 1996 shows that the proportion of workers in smoke-free environments has increased, but improvements still are needed.

Fig. 28:



Public support for smoking restrictions in various indoor settings remains high. In 1996, a clear majority of adults thought smoking should be strictly prohibited in places where people conduct personal or public business, such as offices, hospitals, and shopping malls. Tolerance for smoking was relatively high in cocktail lounges and bars; however, even in this setting 45% of adults favored some smoking restrictions and 24% thought smoking should be strictly prohibited.

Fig. 29:



Barriers and Motivators

Laws and Regulations

State laws and regulations have had a strong positive effect on indoor air quality in Washington. The Clean Indoor Air Act of 1985 was the initial impetus for change. Then, in 1989, an Executive Order by the Governor established a no smoking policy within state facilities. Most recently, in 1994, the Department of Labor & Industries established workplace air regulations that prohibit smoking in office work environments. These regulations include additional provisions for enclosed smoking rooms which satisfy specific criteria regarding ventilation, cleaning and maintenance, and clear designation as a smoking room.

Exemptions to State Laws and Regulations

A limitation of current state laws and regulations is that they do not protect all work and public environments. Work environments not covered by current laws and regulations include manufacturing and other non-office work settings, restaurants and bars with smoking sections, bowling alleys, residences with multiple occupancy (e.g., condominiums, apartments, hotels), and retail service establishments (e.g., beauty salons).

Conclusions

Summary of Key Findings

Washington has not yet met its year 2000 goals related to tobacco use. Further, we are not likely to meet our goals if current trends continue.

The data analyzed for this reported revealed several disparities in smoking prevalence among youth and adults. Based on the findings, it is recommended the following groups be targeted for future tobacco prevention and control activities:

- Youth;
- Young adults (18-24 years of age);
- Persons with low income (family income < \$25,000);
- Persons with low education (< high school graduate);
- Residents of Lewis, Pacific and Grays Harbor counties;
- American Indian/Alaska Natives,
- Pregnant women;
- Persons employed in blue collar and service occupations.

There is substantial overlap in these target groups. For example, women who smoke during pregnancy also are likely to be young, low income, low education, and reside in a geographic area with high overall smoking prevalence. In choosing intervention strategies, it is recommended that preference be given to strategies with capacity to impact multiple disparities.

The data showed that smoking patterns vary by age, gender, and race/ethnicity. These differences may reflect distinct, unique motivations for initiating and continuing the use of tobacco. Among youth, we further noted that young smokers fit a "high risk" profile that is likely to include use of other drugs, low commitment to school, poor school performance, and poor social skills. This information should be considered in developing tobacco prevention and control strategies for specific target populations.

The data showed that pregnancy provides a window of opportunity for smoking cessation efforts. A substantial percentage of women quit smoking during pregnancy; however, many resumed smoking soon after delivery. For long-term success, interventions for pregnant women should include cessation and maintenance components that extend well beyond the pregnancy period.

Other findings of note include the following:

- The majority of adult smokers indicated they would like to quit and had made at least one quit attempt during the past year;
- Cigarette price increases have not yet produced the expected decline in tobacco consumption;
- Public support for smoking restrictions in various indoor settings was very high;
- Enforcement of regulations prohibiting sales of tobacco to minors varied by region and type of store.

Continuing Needs for Data and Assessment

The statistics for this report were obtained from several DOH data systems as well as data produced by other state and national agencies. These existing sources of data can be used to benchmark and measure progress on many of our state's tobacco-related goals. It is likely, however, that additional

data will be needed to develop and evaluate a comprehensive tobacco prevention and control program. The full scope of data needed for assessment purposes requires further review and refinement.

One of the monographs to be produced in 1999 by the DOH Office of Community Wellness & Prevention will focus on current and future data requirements. This report will identify:

- Data needed to benchmark and monitor progress on selected performance indicators.
- Data sources to be used (new or existing);
- Scope of data (statewide or population subgroups);
- Frequency of data collection (ongoing or special studies);
- Agencies and organizations with lead responsibility for assuring that essential data are collected, analyzed, and disseminated.

Linking Data to Public Health Action

There are currently five sites in Washington with established capacity to implement comprehensive tobacco prevention and control programs. These sites are located in Spokane, King, Clark, Pierce, and Snohomish Counties. Each site provides educational information to their communities, develops and maintains local coalitions, designs and implements tobacco prevention activities for youth, and coordinates a variety of community-wide prevention activities. These programs are directed by the DOH and funded by the National Cancer Institute through September, 1999. Future funding for these programs will be provided through the National Centers for Disease Control and Prevention.

In implementing the findings of this report, it is recommended that existing community capacity and infrastructure be utilized to the extent possible. New programs should be instituted in areas of the state that have been identified as "high risk".

Recent Tobacco Settlement

The recent favorable settlement in Washington's tobacco litigation has given our state further opportunity to expand current tobacco prevention and control efforts.

In 1998 DOH staff participated in the Attorney General's Task Force on Tobacco to develop recommendations for a comprehensive tobacco prevention and control plan for Washington. These recommendations, summarized below, will be reflected in future DOH action plans.

- Establish a statewide oversight committee.
- Improve school-based tobacco programs to impact the largest percentage of our youth.
- Create ready access to reputable and effective cessation programs for Washington citizens, with special emphasis on youth.
- Reduce access to tobacco among youth by strengthening our laws and increasing our enforcement efforts.
- Expand community-based programs throughout the state to offer a variety of services and interventions to prevent and combat tobacco use particularly by our children.
- Implement an effective ongoing public education and awareness campaign that will counter pro-tobacco messages.
- Evaluate programs on a regular basis to ensure that Washington has the best and most effective programs.
- Consider policy changes that are important to a comprehensive and sustained tobacco prevention and control plan.

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Appendix A: Primary Data Sources

Overview

The reader should note that the data presented in this report are largely limited to statistics on cigarette smoking. Although the health risks associated with other tobacco products and environmental smoke exposure are documented in published research, the availability of state and regional data to benchmark and measure progress in these areas is limited. These data deficiencies are being addressed to some extent. For example, questions regarding the use of smokeless tobacco were added to the adult behavioral risk factor surveys in 1987, 1988, 1992-1995, and 1997 to present. In 1998, questions on cigar and pipe smoking were included in the adult and youth behavioral risk factor surveys. For estimates of environmental smoke exposure, we continue to rely on published data from the U.S. Environmental Protection Agency and the National Cancer Institute.

The statistics in this report were obtained from several DOH data systems as well as data produced by other state and national organizations. The following material describes the primary sources of data used for charts and baseline measurements:

Death Certificate System

The Death Certificate System provides public health information and establishes legal benefits. The system includes all deaths in Washington, for residents and occurrences, dating back to 1907. Automated records are available from 1968 to present. The system provides demographic information as well as the underlying and contributing causes of death. A data item on the smoking history of the decedent was added to the death certificate in 1988.

Demographic information is gathered by funeral directors; cause of death is reported by the attending physician or the coroner/medical examiner. Certificates are filed with the local health jurisdiction, retained for about 60 days for local issuance purposes, then filed with DOH. Cause of death coding is performed by DOH nosologists using the International Classification of Disease, Ninth Revision (ICD-9), published by the World Health Organization.

The Death Certificate System is useful for examining trends in mortality over time; comparing local, state, national and international trends; and comparing population subgroups (e.g., age, sex, race, occupation). Caution is advised in analyzing deaths for certain racial subgroups (e.g., Asian/Pacific Islander, American Indian/Alaska Native) because the number of such deaths may be underestimated due to misclassification.

Birth Certificate System

The Birth Certificate System provides public health information about births and newborns, and establishes legal rights associated with birth, paternity, and adoption. The system includes all births in Washington, for residents and occurrences, dating back to 1907. Automated records are available from 1968 to present. The birth certificate system includes information items about the mother, the infant, the pregnancy, birth procedures, and birth outcomes. A data item on mother's smoking history was added to the birth certificate in 1984.

Information for birth certificates comes from medical records and worksheets completed by the mother. Completed birth certificates are submitted through an automated information system by hospitals and birth attendants.

The Birth Certificate System is useful for examining trends in natality over time; comparing local, state, national and international trends; comparing population subgroups (e.g., race, age of mother); and investigating factors that affect birth outcomes. Caution is advised in interpreting data on health risk behaviors during pregnancy (e.g., alcohol or tobacco use); such behaviors may be underestimated since they are based on self-reports from mothers and subject to norms of social acceptability.

Behavioral Risk Factor Surveillance System

The Behavioral Risk Factor Surveillance System (BRFSS) provides indicators of health risk behavior, health care use and access, preventive practices, and attitudes in the population. BRFSS, implemented in Washington in 1987, and supported in part by Centers for Disease Control and Prevention Cooperative Agreement U58/CCU002118-1-11 (1987-97), includes a sample of adults in households with telephones. In 1997, the sample included 3,604 adults.

BRFSS provides information on health risk-behaviors (smoking, physical inactivity, nutrition); use of preventive services (cancer screening); use of health care; attitudes about health-related behavior; and demographic and socio-economic information (age, sex, race, income).

Data are gathered from a randomly selected sample of adults living in households with telephones. Interviews are conducted in English by a survey research firm following survey administration protocols established by the Centers for Disease Control. The questionnaire includes core questions included by all states and questions on topics of specific interest to Washington.

BRFSS data are useful for obtaining statewide estimates of the prevalence of health risk behaviors, examining trends and patterns in risk behaviors, and establishing profiles of persons at risk. Caveats of the data are:

- BRFSS may underrepresent the poorer and more mobile portions of the population since they are less likely to live in homes with telephones.
- BRFSS does not represent persons who do not speak English.
- BRFSS does not represent persons who live in institutions or military housing.
- Health risk behavior may be underestimated since it is self-reported behavior subject to social acceptability norms.
- Separate analyses of small geographic areas and subpopulations (e.g., racial/ethnic groups, some counties) may not be possible with the statewide sample.

Washington State Survey of Adolescent Health Behaviors

The Washington State Survey of Adolescent Health Behaviors (WSSAHB) provides information about the health attitudes and behaviors of Washington youth. A student survey has been conducted in Washington in even numbered years since 1988, under the auspices of the Washington Office of the Superintendent of Public. The WSSAHB includes a sample of public school students in grades 6, 8, 10 and 12 across the state. The 1998 survey included 14,601 youth.

The survey provides information on tobacco, alcohol and other drug use, violence, related risk and protective factors, and demographics (age, race, gender).

Survey samples are selected using a stratified cluster sampling procedure, with schools being the primary sampling unit. The survey is conducted by a research firm following survey administration protocols approved by the Washington State Office of the Superintendent of Public Instruction.

Data from student surveys are useful for obtaining statewide estimates of the prevalence of health risk behaviors among youth, examining trends and patterns in risk behaviors, and establishing profiles of persons at risk. Caveats of the data are:

- Student surveys does not represent youth who have dropped out of school.
- Health risk behaviors may be underestimated for high school students due to the exclusion of dropouts and the likelihood that these youth are the most likely to engage in high risk behavior.
- Health risk behaviors may be underestimated since it is self-reported behavior subject to social acceptability norms.
- Separate analyses of small geographic areas are not possible with the statewide sample.

Youth Tobacco Sales Compliance System

The Youth Tobacco Sales Compliance System provides information on tobacco sales to minors. This system, implemented by DOH in 1994, includes a sample of retail outlets licensed to sell tobacco. In 1998, the sample included 565 sites.

Data are gathered by local health department staff, who use trained and adult-supervised volunteer youth to conduct "buy attempts" at the sample sites. This system collects information about factors associated with tobacco sales to minors (type of store, age of clerk, age of youth, location of store, requests for ID, and display of warning signs).

Data from this system are used to assess compliance with current laws prohibiting the sale of tobacco to minors and requiring the display of warning signs.

Caveats associated with these data are:

- The system does not include sales on military bases and Indian reservations, which are exempt from state law.
- Youth who volunteer for "buy attempts" may not be representative of young smokers in our state.
- The sample size is too small to permit county comparisons.

Pregnancy Risk Assessment Monitoring System

The Pregnancy Risk Assessment Monitoring System (PRAMS) supplements birth certificates and generates state-specific data for planning and evaluating perinatal health programs. The system, started in 1993, includes a sample of new mothers (2-6 months postpartum) who are residents of Washington.

PRAMS includes information about the mother's age, race/ethnicity, education level, socio-economic status, health care during pregnancy, and health behaviors (including smoking). Information about infant health care is also included.

The participants in the system are selected from birth certificate data using a stratified random sample based on race. The sample consists of about 600 new mothers from each racial/ethnic group (overall 5% of all Washington births). Survey information is collected through a self-administered questionnaire with telephone follow-up for non-responders.

The PRAMS data are useful for monitoring statewide trends in behavioral risks, health care, and pregnancy outcomes over time. Caveats of the data are:

- Health risk behavior may be underestimated since it is self-reported behavior subject to social acceptability norms.
- The sample design prevents analysis of regional/county-specific data.
- Collection of information 2-6 months after delivery may impact responses to more subjective questions and limits follow-up time for outcomes.

Cigarette Sales and Tax Records

Cigarette sales and tax records are maintained by the Washington State Department of Revenue. These data are used to monitor trends in cigarette consumption, prices, and excise taxes.

A limitation of the sales and tax reports is that they do not include illegal and tax exempt sales. To compensate for this limitation, the Department of Revenue produces annual estimates of untaxed cigarette sales and the revenue losses from illegal untaxed sales (tax evasion). The data used for these estimates come from a variety of sources, including:

- Washington State Department of Revenue (tax data),
- Washington State Department of Health (1997 report, Cigarette Consumption in Washington State¹⁶)
- The Tobacco Institute (WA, ID, OR retail prices),
- US Department of Agriculture (wholesale prices),
- US Department of Defense (WA military personnel),
- Washington State Forecast Council (personal income, GNP deflator),
- Washington State Office of Financial Management (population estimates), and
- Washington State Liquor Control Board (enforcement efforts).

NCI Current Population Survey - Tobacco Use Supplement

The Current Population Survey (CPS) is a continuous monthly survey conducted by the US Bureau of the Census. It focuses primarily on labor force indicators for the civilian noninstitutionalized U.S. population, including individuals 15 years old or older. The Tobacco Use Supplement was developed by the National Cancer Institute and incorporated into the CPS in 1992.

The CPS is a probability sample based on a stratified sampling scheme of clusters of four neighboring households. The three main sources are households listed in the most recent national census, updated building permits, and area sampling where no address lists from the Bureau of the Census exist. The sample includes representation from approximately 2000 counties and independent cities with coverage in every state and the District of Columbia. Approximately 56,000 households containing approximately 110,000 persons are interviewed each month. Approximately 25% of all interviews are conducted in-person and 75% by telephone.

The Tobacco Use Supplement can be used to monitor workplace smoking policies and the characteristics of these policies; public attitudes toward smoking restriction in various public settings, such as restaurants, indoor worksites, and indoor shopping malls; public opinion about smoking control policies; and smoking and tobacco cessation counseling provided by physicians and dentists.

Appendix B: Technical Notes

Handling of Missing Data

A factor that affects the accuracy of data is the number of unknowns among responses. The information may be overlooked or refused by the informant, or the informant may not have been asked for the data. Missing responses create uncertainty in the analysis of data because researchers don't know how non-respondents compare to respondents (e.g., are smokers less likely to respond to a question on smoking?).

In preparing the data for this report, we excluded records that did not contain the items of interest. For example, the reported statistics on prevalence of smoking by age include only those records that included the respondent's smoking status and their age.

The completeness of reporting was 95% or higher for most data items analyzed in this report, thus the exclusion of missing data had little impact on the findings. However, the reader should be aware that the exclusion of missing data means that the smoking statistics presented in this report may be somewhat different than figures published elsewhere.

Use of Confidence Intervals

Confidence intervals are presented in this report only for estimates based on survey data (i.e., BRFSS, WSSAHB, PRAMS, and the Tobacco Sales Compliance System). Confidence intervals were generated with STATA, a software package designed to produce accurate error estimates and confidence intervals for complex survey data.

The confidence interval characterizes the precision of an estimate. In this report we show 95% confidence intervals, indicating that we are 95% confident that the true value lies between the lower and upper boundaries of the interval. The confidence intervals in this report were produced using the normal theory method.

Use of Statistical Tests

This report is primarily a descriptive analysis of existing data. In a few instances statistical tests were performed. All statistical tests were performed using STATA software and commands appropriate for survey data. Tests for trend (e.g., changes in the prevalence of smoking over time) were evaluated with logistic and linear regression. Associations between data items (e.g., smoking status and age) were evaluated with chi-square tests. The results of these tests are shown as probability values in the text. A value of $p < .05$ is considered statistically significant.

Methodology for Determining Smoking-Attributable Deaths

Estimates of deaths attributable to smoking were determined using SAMMEC 3.0, a software application developed by the Centers for Disease Control and Prevention. SAMMEC 3.0 provides a list of smoking-related causes of death, derived primarily from the 1989 Report of the Surgeon General. The list also include several perinatal conditions linked to maternal smoking. SAMMEC 3.0 permits the inclusion of four such conditions that have particularly strong associations with smoking (short gestation and low birth weight, respiratory distress syndrome, respiratory conditions of the newborn, and sudden infant death syndrome). Causes of death are designated by codes from the International Classification of Diseases, 9th Revision. The critical calculation in SAMMEC 3.0 is the smoking-attributable fraction (SAF) for each smoking-related cause of death. The SAF is the maximal

proportion of deaths causally linked to cigarette smoking. Calculation of the SAF requires two other measures: disease-specific relative risk estimates and smoking prevalence estimates. The disease-specific relative risks are based on a large quantity of research on the association between smoking and disease. The smoking prevalence data come from Washington's BRFSS. Data on maternal smoking come from birth certificates.

Additional information on SAMMEC methodology is available in the SAMMEC 3.0 documentation published by the Centers for Disease Control and Prevention, Office on Smoking and Health.

Classification of Race and Ethnicity

This report includes race and ethnicity information from BRFSS, WSSAHB, and the Birth Certificate System. The race/ethnicity classification schemes used by these systems vary to some extent. The similarities and differences are:

- All data sources classify race according to information supplied by survey respondents.
- All sources include response categories for the four major race groups: White, African American, American Indian/Alaska Native, and Asian/Pacific Islander.
- All sources include an "other" race category which typically includes persons who identify themselves as "mixed race" or "multiracial".
- The BRFSS and Birth Certificate System ask race and Hispanic ethnicity as two separate questions; whereas the WSSAHB has one race question and Hispanic is considered a category of race.

Age-Adjusted Rates

The Background Section of this report includes county-specific age-adjusted death rates for lung cancer. Age-adjusted rates were used to account for differences in the age distribution of county populations.

The age-adjusted rates were computed by taking a county's lung cancer death rate for each age group and applying it to the 1970 U.S. population. The age-adjusted rate tells us what the county's death rate would be if it had the same age distribution as the U.S. population did in 1970. It is important to note that an age-adjusted death rate has no absolute meaning; it is an artificial number based on a hypothetical population and is only useful for making comparisons between different geographic areas or time periods.

Appendix C: Statistical Supplement

Included here are detailed statistics for selected charts and figures presented in the body of this report. They are listed in the order in which they appear.

Background

Fig. 4: Average Annual Age-Adjusted Lung Cancer Death Rates, Washington 1990 - 1997

<i>County</i>	<i>Age-Adjusted Rate</i>	<i>Count</i>
San Juan	28.6	48
Lincoln	36.8	47
Whitman	37.9	95
Douglas	39.3	110
Walla Walla	39.9	216
Adams	41.8	51
Whatcom	43.2	540
Grant	43.3	241
Island	45.8	297
King	46.4	6,115
Skagit	46.5	452
Clallam	46.9	412
Stevens	47.7	150
Wahkiakum	47.7	19
Kittitas	48.1	125
Skamania	48.2	36
Jefferson	48.5	160
Snohomish	49.2	1,887
Chelan	50.0	297
Thurston	50.8	792
Benton	50.9	485
Pierce	50.9	2,573
Klickitat	51.2	92
Yakima	51.3	914
Kitsap	52.2	863
Spokane	52.4	1,867
Franklin	52.8	157
Cowlitz	53.8	464

Asotin	54.3	107
Lewis	56.9	387
Clark	57.1	1,240
Okanogan	57.2	202
Pacific	59.7	178
Columbia	61.9	29
Mason	64.0	321
Pend Oreille	65.4	68
Grays Harbor	67.8	480
Garfield	69.2	16
Ferry	70.9	39
<i>State Total</i>	<i>49.6</i>	<i>22,572</i>

Tobacco Use by Adults

Fig. 5: Adult Smoking Prevalence, Washington 1997

	%	95% CI
Current Smokers	23.8	(22.1,25.6)
Former Smokers	26.9	(25.2,26.9)
Never Smoked	49.3	(47.3,51.3)

Fig. 6: Adult Smoking Prevalence by Gender & Year, Washington 1987 – 1997

	<i>Male</i>		<i>Female</i>		<i>All Adults</i>	
<i>Year</i>	%	95% CI	%	95% CI	%	95% CI
1987	26.7	(22.8,31.1)	20.8	(17.7,24.3)	23.7	(21.2,26.5)
1988	25.3	(21.5,30.0)	24.0	(20.8,27.5)	24.6	(22.1,27.4)
1989	23.2	(19.9,26.9)	25.1	(22.1,28.4)	24.2	(21.9,26.6)
1990	25.4	(22.3,28.7)	19.7	(17.5,22.2)	22.5	(20.6,24.6)
1991	23.9	(21.1,27.0)	22.6	(20.1,25.4)	23.3	(21.3,25.3)
1992	22.6	(20.0,25.3)	20.2	(18.1,22.6)	21.4	(19.7,23.1)
1993	23.0	(20.4,25.7)	20.9	(18.6,23.3)	21.9	(20.2,23.7)
1994	24.4	(22.1,26.8)	19.5	(17.7,21.5)	21.9	(20.4,23.5)
1995	20.1	(17.9,22.5)	20.3	(18.4,22.3)	20.2	(18.7,21.8)
1996	24.6	(22.3,27.9)	22.4	(20.3,24.5)	23.4	(21.9,25.1)
1997	25.0	(22.4,27.9)	22.6	(20.6,24.9)	23.8	(22.1,25.6)

Fig.8: Adult Smoking Prevalence by Age, Washington 1997

<i>Age</i>	<i>%</i>	<i>95% CI</i>
18-24	30.0	(23.9,36.8)
25-34	28.6	(24.9,32.8)
35-44	26.1	(22.6,29.8)
45-54	24.9	(20.6,29.7)
55-64	21.3	(17.1,26.3)
65+	11.3	(8.9, 14.1)
All ages	23.8	(22.1,25.6)

Fig.9: Adult Smoking Prevalence by Race/Ethnicity, Washington 1993 – 1997

<i>Race/Ethnicity</i>	<i>%</i>	<i>95% CI</i>
African American	28.5	(22.4,35.4)
American Indian/ Alaska Native	36.7	(30.3,43.5)
Asian/ Pacific Islander	16.0	(12.8,19.8)
Hispanic ethnicity*	22.2	(18.5,26.4)
White	22.0	(21.3,22.8)
Other Race	35.6	(26.8,45.5)
*persons of Hispanic ethnicity can be of any race		

Fig.10: Adult Smoking Prevalence by Income, Washington 1997

<i>Income (in \$ 000s)</i>	<i>%</i>	<i>95% CI</i>
<10	32.7	(21.3,46.6)
10-14	32.8	(25.9,40.6)
15-19	34.2	(27.0,42.2)
20-24	35.5	(29.5, 42.0)
25-34	28.3	(24.3,32.6)
35-49	22.9	(19.3,26.9)
50+	15.8	(13.4,18.4)

Fig.11: Adult Smoking Prevalence by Education, Washington 1997

<i>Education level</i>	<i>%</i>	<i>95% CI</i>
some high school	43.8	(36.7,51.1)
high school grad	28.7	(25.8,31.9)
some college	26.9	(23.5,30.6)

4+ years college	10.6	(8.7,12.8)
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Level of Nicotine Addiction, Washington 1997

	%	95% CI
Daily smokers	78.0	(73.7,81.8)
Occasional smokers	22.0	(18.2,26.3)

Efforts to Quit, Washington 1997

	%	95% CI
Quit for 1 or more days	51.1	(46.5,55.7)

Use of Smokeless Tobacco, Washington 1993-1997

	%	95%CI
General adult population	2.9	(2.5,3.8)
Persons aged 18-24 yrs.	6.1	(4.4,8.4)
Persons aged 35+ yrs..	1.5	(1.2,1.8)
Males	5.7	(5.0,6.5)
Females	0.1	(0.07,0.3)

Tobacco Use by Youth

Fig. 13: Youth Smoking Prevalence, U.S. and Washington

	U.S. 1997		Washington 1998	
	%	95% CI	%	95% CI
Grade 6	n/a	n/a	5	(4.0,5.6)
Grade 8	19.4	n/a	15.2	(13.2,17.5)
Grade 10	29.8	n/a	21.8	(18.9,25.1)
Grade 12	36.5	n/a	28.6	(24.6,33.0)

Age and Gender: Average age of first tobacco use, Washington 1988

Age in years	95% CI
12.0	(11.8, 12.3)

Fig. 15: Youth Smoking Patterns by Grade, Washington, 1998

	ever smoked	smoked within	regular
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			<i>past 30 days</i>		<i>smoker (5+ cigarettes/day)</i>	
	%	95% CI	%	95% CI	%	95% CI
6th grade	25.7	(22.7,28.9)	4.7	(4.0,5.6)	0.5	(0.3,1.0)
8th grade	48.2	(44.3,52.2)	15.2	(13.2,17.5)	3.4	(2.6,4.4)
10th grade	63.4	(60.0,66.7)	21.8	(18.9,25.1)	9.1	(6.9,12.0)
12th grade	68.4	(64.6,72.0)	28.6	(24.6,33.0)	11.6	(8.8,15.1)

Fig.16: Youth Smoking Prevalence by Gender, Washington 1998

<i>grade</i>	<i>female</i>		<i>male</i>	
	%	95% CI	%	95% CI
6th - 8th	11.2	(9.1,13.7)	8.9	(7.3,10.8)
10th - 12th	27.4	(24.6,30.3)	21.5	(18.4,25.1)

Fig. 17: Youth Smoking Prevalence by Race/Ethnicity, Washington 1998

<i>Race/Ethnicity</i>	%	95% CI
African American	14.9	(9.5,22.5)
American Indian/ Alaska Native	27.2	(20.9,34.5)
Asian/Pacific Islander	11.9	(9.1,15.5)
Hispanic	16.8	(13.4,20.9)
White	16.9	(14.9,19.1)
Other	16.6	(13.4,20.4)

Fig.19: Where Youth Obtained Cigarettes, Washington 1998

<i>Source</i>	<i>Middle school</i>		<i>High school</i>	
	%	95% CI	%	95% CI
Adults	23.2	(18.7,28.3)	15.8	(11.1,21.9)
Friends	62.4	(57.0,67.5)	33.7	(27.3,40.1)
Vending machines	1.6	(0.8,3.1)	0.4	(0.2,1.0)
Stores	12.8	(10.2,16.0)	50.1	(40.5,59.7)

Fig.20: Tobacco Sales to Minors by Type of Store, Washington 1998

<i>Store Type</i>	<i>% sales made</i>	<i>95% CI</i>
Convenience store	14.4	(10.9,18.9)
Grocery store	21.8	(14.4,31.8)
Pharmacy/ department store	13.5	(5.7,28.7)
Restaurant/ lounge	10.9	(5.0,22.3)
Other	12.7	(6.7,22.6)
All Stores	14.7	(11.8,17.6)

Tobacco Sales to Minors by Region, Washington 1997 - 1998

<i>Region</i>	<i>Counties</i>	<i>% sales made</i>	<i>95% CI</i>
Region 1	Whatcom	13.3	(5.1,30.6)
Region 2	Island, San Juan, Skagit	26.9	(13.4,46.7)
Region 3	Chelan, Douglas, Kittitas, Okanogan	17.1	(8.4,31.7)
Region 4	Kitsap	3.3	(0.8,12.4)
Region 5	Clallam, Jefferson, Mason	3.6	(0.5,21.5)
Region 6	Snohomish	6.0	(2.5,13.7)
Region 7	King	6.8	(4.7,9.7)
Region 8	Pierce	13.2	(8.3,20.5)
Region 9	Thurston	17.2	(7.4,35.4)
Region 10	Grays Harbor, Lewis, Pacific	23.1	(13.6,36.4)
Region 11	Clark	9.7	(3.2,26.1)
Region 12	Cowlitz, Klickitat, Skamania, Wahkiakum	10.3	(3.4,27.6)
Region 13	Adams, Ferry, Grant, Lincoln, Pend Oreille, Stevens	15.4	(7.1,30.3)
Region 14	Spokane	1.5	(0.2,10.0)
Region 15	Benton, Franklin	0.0	n/a
Region 16	Yakima	30.3	(17.1,47.8)
Region 17	Asotin, Columbia, Garfield, Walla Walla, Whitman	6.5	(1.6,22.5)

Fig. 21: Youth Smokeless Tobacco Prevalence, Washington 1998

<i>Grade</i>	<i>%</i>	<i>95% CI</i>
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6th	3.5	(2.3,5.4)
8th	6.7	(5.5,8.1)
10th	9.6	(8.0,11.5)
12th	12.4	(9.3,16.4)

Use of smokeless tobacco, Washington 1998

	%	95% CI
Males grades 6 –12	10.8	(9.1,12.8).
Females grades 6-12	4.5	(3.8,5.4)

Smoking During Pregnancy

Fig. 23: Maternal Smoking Prevalence by County, Washington 1993 – 1997

<i>County</i>	<i>Number</i>	<i>%</i>
Adams	103	6.7
Chelan	356	7.3
Franklin	369	7.5
Whitman	170	8.1
Douglas	201	9.0
King	12262	11.8
San Juan	63	12.3
Yakima	2596	12.4
Grant	802	12.8
Benton	1413	14.3
Whatcom	1149	15.2
Skagit	1020	16.3
Thurston	2004	16.8
Okanogan	463	16.9
Island	831	17.0
Snohomish	6766	17.6
Lincoln	96	18.0
Walla Walla	655	18.2
Pierce	292	18.9
Kittitas	8934	18.9
Clark	4390	19.4
Kitsap	3113	19.4
Skamania	89	20.5
Klickitat	243	20.9
Spokane	5820	21.1

Garfield	21	22.6
Wahkiakum	42	22.6
Jefferson	510	23.0
Stevens	247	23.1
Lewis	1016	23.6
Asotin	307	24.0
Mason	689	26.6
Pacific	291	26.6
Cowlitz	111	27.5
Ferry	1678	27.6
Clallam	915	29.3
Grays Harbor	1267	29.9
Pend Oreille	202	29.9
Columbia	79	34.8
<i>State Total</i>	<i>61575</i>	<i>16.3</i>

Fig. 26: Maternal Smoking Prevalence by Income, Washington 1994 - 1996

<i>Smoking Status</i>	<i>Medicaid receiving cash grant (lowest income)</i>		<i>Medicaid Non-grant (low income)</i>		<i>Non-Medicaid (higher income)</i>	
	<i>%</i>	<i>95% CI</i>	<i>%</i>	<i>95% CI</i>	<i>%</i>	<i>95% CI</i>
smoked prior to pregnancy	53.4	(48.3,58.5)	27.5	(23.8,31.2)	18.4	(16.2,20.5)
smoked during pregnancy	37.8	(32.6,43.0)	16.2	(13.0,19.3)	8.4	(6.8,10.0)
smoked after pregnancy	45.7	(40.5,50.9)	21.2	(17.8,24.6)	13.1	(11.2,15.0)